

Web 2.0

By Daisy Abbott, The Glasgow School of Art

- [Introduction](#)
- [Examples of Web 2.0 in Practice](#)
- [HE/FE Perspective](#)
- [e-Science Perspective](#)
- [Issues to be Considered](#)
- [Additional Resources](#)

1. Introduction

The term 'Web 2.0' refers to a way of thinking about networked communications; a collaborative and social way of working underpinned by the key concept of the Web (rather than the desktop) as a platform. Web 2.0 is characterised by data sharing, personalised data consumption, Web-based communities, and Web-hosted services and applications. Examples of typical Web 2.0 technologies are social networks, media-sharing sites, wikis, blogs, social bookmarking, folksonomies, syndicated content (RSS) and Rich Internet Applications (RIAs).

The term was coined in 2004 by Dale Dougherty, a vice-president of O'Reilly Media.¹ As the concept has matured, along with the development of Web technologies and standards, it is having a significant impact on distributed infrastructure and applications, and on the way users and developers interact.² Web 2.0 maximises the potential of various ideas about networked communication including contribution (user-generated content), collaboration over networks, community participation ('the power of the crowd'), data on an enormous scale, combining datasets (e.g. mashups), and open sharing.³

The concepts behind Web 2.0 can change approaches to research; increasing access to data and expertise, creatively combining data to produce new knowledge, and encouraging large scale participation and personalisation. However, alongside these benefits to researchers, goes a challenge for the curation of large, complex, and dynamic data.

Scholarship is becoming more technologically mediated, even if researchers are not necessarily interested in how the technology works. Web 2.0's emphasis on concept and process rather than the release of a 'product' leads to new roles within research: those who develop applications/software/standards are now less separated from those who use these tools for research, many of whom now take up a 'hacker' role i.e. building upon or subverting an existing technology to fit a new purpose.⁴ This concept of 'generativity' and of ideas, data, or code development by non-developers is a key characteristic of Web 2.0. It allows tools to be customised more closely to the needs of users, and to fit purposes for which they were never originally intended.

2. Examples of Web 2.0 in Practice

There are many examples of Web 2.0 services and systems of use to academia, some of which are already making an impact on learning and research. Web 2.0 technologies specifically for curation are

¹ O'Reilly (2005).

² Anderson (2007).

³ O'Reilly (2005) lists seven principles of Web 2.0: the Web as platform; harnessing collective intelligence; data is the next 'Intel inside'; the end of the software release cycle; lightweight programming models; software above the level of a single device; and rich user experience.

⁴ Eric Meyer at The Influence and Impact of Web 2.0 on e-Research Infrastructure, Applications and Users, 2009.

less prevalent, although some initiatives are emerging.⁵ A few of the most relevant examples are noted below:

Cloud computing

Based on the concept of Software as a Service (SaaS), cloud computing delivers virtualised resources across the network, i.e. storage, platforms, software and so on are accessed remotely over a network of computers, known as the 'cloud'.⁶ It is scalable, allows the 'outsourcing' of IT support, provides services on-demand, and is attractive to users who require a 'pay as you go' cost model with a low start-up cost. However there are clear concerns for curators, given the possibility that anything in 'the cloud' is outside the control of users and could potentially disappear, or be curated to different standards or methodologies. The cloud computing community are developing a Bill of Rights for users.⁷ An example of the use of cloud computing in Higher Education is the CARMEN project (<http://www.carmen.org.uk/>) which uses a private cloud for neurophysiology research.⁸

Ajax technologies

Ajax (which originally stood for Asynchronous JavaScript and XML) comprises a group of Web technologies for programming Rich Internet Applications that communicate with servers in the background, without interfering with the current state of the page or the user's interaction with it.⁹ For example, a text box in a search interface can look up and provide suggestions for journal titles based on the first few letters a user types in, allowing auto-completion from a validated list.¹⁰

A few selected tools for researchers are:

- [Mendeley](#) — software for managing a library of research papers
- [MyExperiment](#) and [Taverna](#) — for designing and sharing workflows
- [Slideshare](#) and [SciVee](#) — for sharing presentation slides, posters, and videos of your research
- Geographic information tools/projects such as GeoVUE, MapTube, and other software provided by the UCL Centre for Advanced Spatial Analysis¹¹
- [The Journal of Virtualised Experiments \(JOVE\)](#) — biological research published in video format¹²
- [iGoogle](#) and [Pipes](#) — personalised mashups of various content, including syndicated feeds
- [Googlegadgets](#) — for disseminating personalised, dynamic content as miniature objects on web pages

3. HE/FE Perspective

"The open nature of Web 2.0, its easy-to-use support for collaboration and communities of practice, its ability to handle metadata in a lightweight manner and the nonlinear nature of some of the technology [...] are all attractive in the research environment."

— Anderson, P. (2007). "[What is Web 2.0? Ideas, technologies and implications for Education](#)" JISC Technology and Standards Watch.

4. e-Science Perspective

⁵ E.g. McCown et al. (2009).

⁶ Examples include: [Amazon Web Services](#) and [GoogleApps](#).

⁷ [Cloud Computing Bill of Rights](#).

⁸ For more information, see Watson (2008).

⁹ More about Ajax is available from the [W3Schools Ajax tutorial](#).

¹⁰ See [Romeo look-up demo](#).

¹¹ See [GeoVUE](#), [Maptube.com](#), and [CASA](#).

¹² See also [Open Wetware](#).

"Web services, interfaces that simplify access to both data and software, can enable scientists to access multiple existing interoperable databases and mesh together relevant data from each to create a new, richer, data collection. The limitation on the potential of such services is not technological but cultural — they can work successfully only with real-time access to the source databases and of course can work only on publicly available content."

— Swan, A. (2006). "Overview of scholarly communication" in Jacobs, N. (ed.) *Open Access: Key Strategic, Technical and Economic Aspects*, (Chandos Publishing: Oxford, UK) p. 7.

4. Issues to be Considered

- What are the privacy implications for data that is being openly shared, repurposed, and mashed up? There are also ongoing concerns surrounding the security of data in Web 2.0 platforms and applications, another very important issue.¹³
- "The development of the Web has seen a wide range of legal, regulatory, political and cultural developments surrounding the control, access and rights of digital content. However, the Web has also always had a strong tradition of working in an open fashion and this is also a powerful force in Web 2.0: working with open standards, using open source software, making use of free data, re-using data and working in a spirit of open innovation." (Anderson, 2007) Who owns data when it has evolved into different formats and combinations? There is a tension between 'freeing' data and protecting the rights (where they exist) of data owners.
- In terms of data curation do the characteristics of Web 2.0 make it challenging to collect and preserve? Is curation of Web 2.0 data fundamentally different to previous Web archiving efforts? Web 2.0 services, mashups, and tools typically use structured layers of data with APIs providing access to very large dynamic datasets. This can make access to the underlying data problematic.
- Much Web 2.0 data is constantly evolving — how should the curation of dynamic resources be managed?
- How transient are current Web 2.0 applications and technologies? Will they be superseded by Web3.0 in the next five years?
- Is there a difficulty with information overload?
- Should researchers be concerned about their digital identities? Web 2.0 encourages mass participation in the forms of tags, comments, and linkages. Does the loss of control over defining one's own identity online pose a threat to academic reputation?¹⁴
- How can digital contributions, products, or processes be credited or cited appropriately?¹⁵
- Is Web 2.0 design being dominated by the technological issues, without giving due care to social design? It is often opined that 'subvertible' or generative design is the key to building a successful Web 2.0 application.

5. Additional Resources

- Presentations from [The Influence and Impact of Web 2.0 on e-Research Infrastructure, Applications and Users](#), 23 -27 March 2009, e-Science Institute, Edinburgh:
 - Watson, P. "An Introduction to Cloud-Based Services"
 - Glaser, H. "From Mashups to Meshups and the Web of Data"
 - Meyer, E., & Power, L. "Web 2.0: The Impact of Bottom-up research Innovation"
 - Henning, V. "Managing and Discovering Research Papers like Music?"
 - Neylon, C. "Success Stories: Walking the Walk: The Experience of Using Web2 Tools in Active Experimental Research Projects"

¹³ Cf. Brodtkin (2008).

¹⁴ For more, see Solove (2007).

¹⁵ Cf. the MESUR project.

- Frey, J. "Subjects, Objects, Blogjects: researchers, Laboratories and the Experimental Record"
- Anderson, P. (2007). "[What is Web 2.0? Ideas, technologies and implications for Education](#)" JISC Technology and Standards Watch
- Brodtkin, J. (2008). "[Gartner: Seven cloud-computing security risks](#)" in InfoWorld
- Buyya, R. et al (2008). "[Market-Oriented Cloud Computing: Vision, Hype, and Reality for Delivering IT Services as Computing Utilities](#)" Grid Computing and Distributed Systems (GRIDS) Laboratory, The University of Melbourne
- Crawford, W. (2006). "[Library 2.0 and 'Library 2.0'](#)" Cites & Insights Vol. 6, No. 2
- Day, M. (2003). "[Collecting and Preserving the World Wide Web](#)" JISC Feasibility Study
- Kelly, B. (2007). "[Web 2.0: What Can It Offer The Research Community?](#)"
- McCown, F. et al (2009). "[Everyone is a Curator: Human-Assisted Preservation for ORE Aggregations](#)" at DigCCurr 2009, North Carolina, USA
- O'Reilly, T. (2005) "[What Is Web 2.0: Design Patterns and Business Models for the Next Generation of Software](#)"
- Owen, M. et al (2006). "[Social Software and Learning FutureLab](#)"
- Solove, D. (2007). "The Future of Reputation: Gossip, Rumor, and Privacy on the Internet", Yale University Press.
- Swan, A. (2006). "[Overview of scholarly communication](#)" in Jacobs, N. (ed.) Open Access: Key Strategic, Technical and Economic Aspects, (Chandos Publishing: Oxford, UK) UKOLN IntroBytes
- Watson, P. et al (2008). "[Cloud Computing for e-Science with CARMEN](#)" at IBERGRID, Porto, May 2008

Digital Curation Centre

Appleton Tower, 11 Crichton Street, Edinburgh, EH8 9LE | t. +44 (0)131 651 1239

DCC | Copyright 2009 | [Some Rights Reserved](#) | [Terms & Conditions](#) | [Privacy Policy](#) | [FOI](#)

The DCC is funded by the Joint Information Systems Committee